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Information theoretic approach to single-particle and two-particle interference in multi-path interferometers

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abstract We propose entropic measures for the strength of single-particle and two-particle interference in interferometric experiments where each particle of a pair traverses a multi-path interferometer. Optimal single-particle interference excludes any two-particle interference, and vice versa. We report an inequality that states the compromises allowed by quantum mechanics in intermediate situations, and identify a class of two-particle states for which the upper bound is reached. Our approach is applicable to symmetric two-partite systems of any finite dimension.